BGL – Netzwerktreffen der Logistik

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Automated Driving Systems in Logistics – A Global Status Overview

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Automated Driving Systems in Logistics – A Global Status Overview

Make the flow of goods more stable, safer & more predictable in practical operations



The Economic Lever Lies in Process Integration

- ✓ Productivity results from less waiting, fewer interruption and better predictability
- ✓ The business case does not depend only on vehicle/transportation costs. Efficient handovers and suitable infrastructure are equally important.



Automation of processes and systems

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Automated Driving Systems in Logistics – A Global Status Overview

Why is automation relevant? → solving existing and well-known problems



This conference addresses in addition:

- E-mobility and charging infrastructure
- Artificial intelligence and digitalization
- Telematics, data availability and vehicle uptime
- Economic pressure and operational collaboration
- Safety and resilience

Key-ingredients of automated transportation and logistics and connects these topics in real-life operations

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Where Automation is Already Working Today

Automation is particularly advanced in clearly defined areas & **Controlled operating environments**

Ports and container terminals

- Automated transport vehicles, yard vehicles, container movers

Logistics and industrial sites

- Repetitive routes, clear traffic rules, defined handover points

Airport and special use sites

- Controlled access, standardized processes, limited speeds

Yard and maneuvering logistics

- recurring movements between gates, docks, parking areas and transfer points



Terberg



BASF



Neolix



Altenwerder

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Where Automation is Already Working Today

Public Roads: → Automated road freight transport is moving from testing toward focused operating models



What these approaches have in common → Trails:

- Limited routes or operating areas
- Limited system or operating conditions (ODD)
- Gradual scaling (testing Milage) rather than broad deployment
- Focus on vehicle operation and control-center functions, NOT on Infrastructure Interfaces (Docking) and large E2E automation

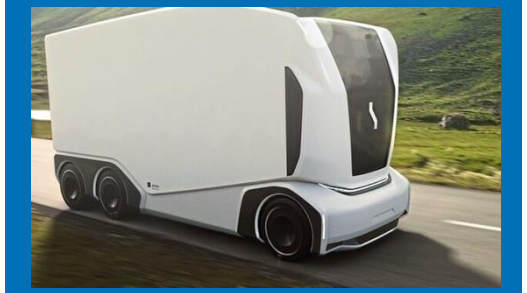
Progress on public roads is real—but the economic breakthrough depends on integration into the overall process.

North America


Kodiak


Aurora

Europe


Einride



SCANIA

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Existing Legal Framework

Relative comparison	EU	USA	China
Regulatory Framework	regulations allows implementation of ADS UNECE: R79, R155, R156, R157, R171, R185 EU-Reg: 2018/858, 2019/2144, 2022/1426 (update 2026), 2024/1689 Germany: AFGBV	FMVSS federal-level Framework for Automated Driving System Safety AVSC + safety case + assurance approach Process definition of ADS Eco-System: Vehicle – Infrastructure – techn. Supervision NHTSA actively promotes testing and deployment of ADS vehicles by issuing guidance documents and policy updates to facilitate innovation	Oriented on UN-R & ISO with mandatory (GB) and recommended (GBT) national standards **NEW**: August 2024: • GB 44495-2024: Information Security (~ UN-R155) • GB 44496-2024: Automobile Software Upgrade (~ UN-R156) • GB 444-97-2024: Intelligent Networked Vehicle Autonomous Driving Data Recording System
Testing requirements	manufacturers must meet specific requirements prior to approval.	no unifying states rules yet: • some states minimum requirements • others have a multi-stage approval process some states have no regulation for ADS at all	Data collection restriction → requires data / mapping license Shanghai's 2023 ADS regulation
Approval	▪ document and evidence assessment (including Simulation), certification tests, real world tests ▪ Small series	• Manufacturer Self-certifying process • Voluntary Safety Self-Assessment (VSSA) with 12 different safety related areas. • Title 49 of the Code of Federal Regulations (CFR) Part 555 – Temporary Exemption	• Document assessment • Certification Test • Real World test.
Automation Level	Up to Level 4 predefined areas, hub-to-hub, valet parking, updated by 2026	Up to Level 4 in selected cities/areas on public roads without safety driver	Level 4 operation in geofenced areas, testing and demonstration

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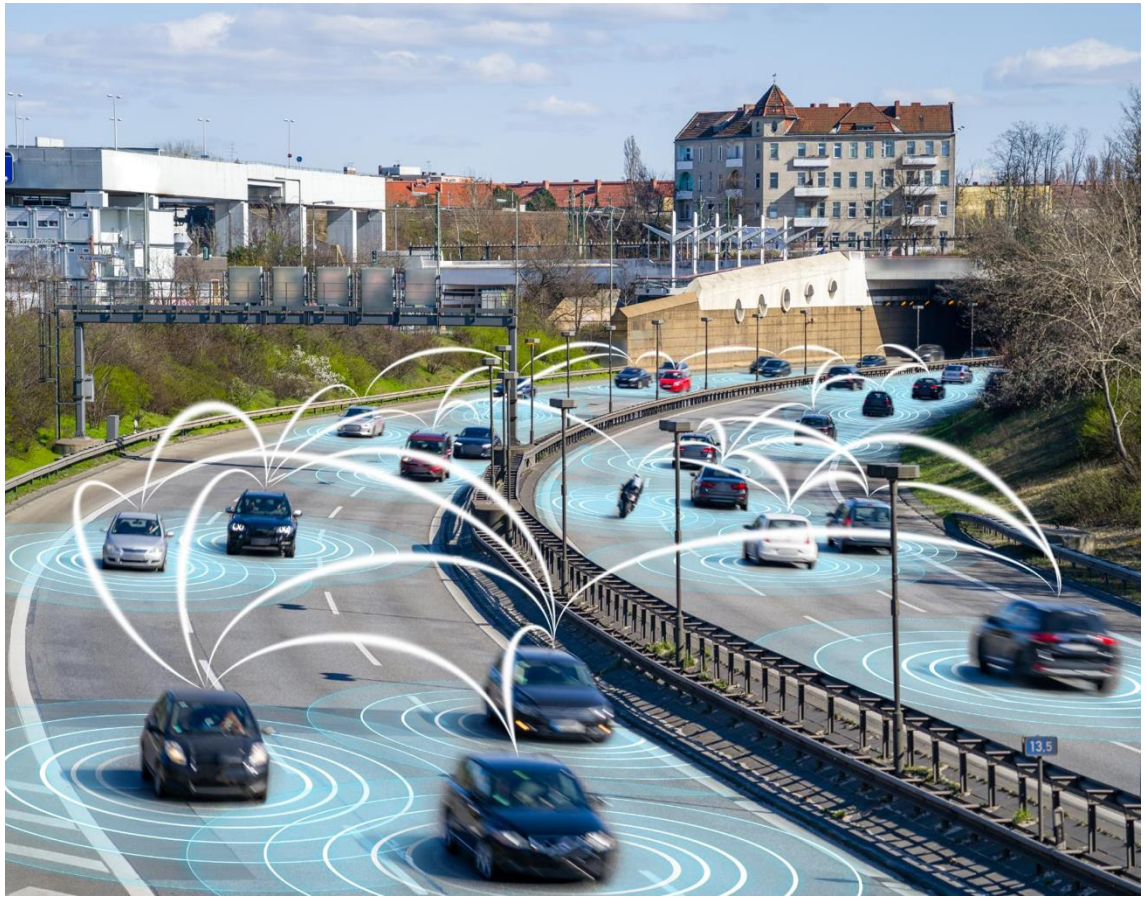
Existing Legal Framework

Relative comparison	APA (Japan, South Korea, Australia)	UAE	India	SAM (Brazil, Argentina, Chile, Colombia, Mexico, Peru)
Regulatory Framework	in collaboration with UNECE	Dubai Law No. 9 of 2023 covers licensing, regulatory, liability and operational standards for autonomous vehicles	Based on global standards (e.g., UNECE guidelines, SAE levels) **NEW**: • AIS 184, defines technical requirements for ADAS (L1 & L2), • AIS 189: CSMS, • AIS 190: SUMS	Almost all the countries mentioned still lack specific national laws regulating autonomous vehicles
Testing requirements	Closed test environments and limited publicly accessible areas, safety driver is mandatory	Driving distance of 2 million documented miles, minimum period is 1 year with all seasons (Authority regulation)	Challenging through extreme climatic conditions, heavy traffic and poor infrastructure	Pilot projects, Universities and international cooperation play a key role in testing
Approval	country specific and UNECE regulations, road test in real world conditions	License issued by the Road and Traffic Authority (RTA)	Standardized tests according to AIS 184	N/A
Automation Level	Level 2: widespread, Level 3: commercial implementation, Level 4: pilot projects	Level 4: Dubai aggressively promoting autonomous mobility, RTA plans up to 4000 Level 4 vehicles until 2030	Level 2: slowly gaining traction, Level 3 & 4: no vehicles on the street	N/A Brazil, Argentina, Chile, Colombia are orientated towards UNECE and ISO standards, Mexico focus on US regulations (FMVSS)

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ADS/IDS System EU Market access requirements

From Technology Readiness to Commercial Reality on public roads



Transition to Commercial Operations

The industry is moving from testing to large-scale commercial deployment of Level 4 autonomous vehicles worldwide.

Regulatory and Legal Compliance

Success depends on meeting EU regulations, local approvals, and safety standards for fleet operations

System-Level Market Access

Market entry requires integrated approval processes covering vehicle certification, operation domains, and continuous safety monitoring.

Strategic European Validation

Germany serves as a validation platform for scalable European expansion leveraging various technical solutions

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Complexity of automated driving systems

Existing Advanced Driving Assistant Systems | EU GSRII + UN-ECE

N1 Type



M2/M3 Type



N2/N3 Type



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Complexity of automated driving systems

Existing Automated Driving Systems | EU ADS + UN-ECE ADS | for public Roads



Regulatory framework for ADS:

EU LEGAL FRAMEWORK

EU 2022/1426

On type approval requirements for automated driving systems

UN LEGAL FRAMEWORK

UN-R185

On uniform provisions concerning the approval of automated driving

AFGBV

National Approval & operating regulation for :
autonomous vehicles

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Autonomous Driving Ecosystem in Logistics

The Logistics Value Chain is an Automation Map that interconnects process steps

Process Automation

Provisioning

Vehicle dispatching, slot management, trailer and order allocation

Loading

process, documentation and departure clearance

Driving on the origin site

Yard movements, maneuvering and transfer to the public road network

Transport on public roads

Hub-to-hub or depot-to-depot transport

Destination site

Access, check-in, traffic management, assignment of dock or parking position

Docking & internal follow-up processes

Unloading, loading, return movements and renewed provisioning

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Autonomous Driving Ecosystem in Logistics

Automated driving is a management task for the entire logistics system.



Automated Driving System



- Legal compliance
- Safe & reliable
- Scalable & measurable

Infrastructure



- Traffic + Yard management
- Interfaces
- Processes & roles

Supervision



- Fleet management
- Performance monitoring
- Cybersecurity & privacy



ODD defined for desired use-case?



ODD matches desired environment?



Ensure E2E technical & operational safety

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Autonomous Driving Ecosystem in Logistics

The added value arises when vehicle, infrastructure and operating processes work together



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Summary Automation in Logistics

Automation is successful where complexity is reduced & processes standardized & safety gained

take away

1. **Automation in logistics does not end at the factory gate.**
2. **Automation does not replace organization.**
3. **Safety, incident management and operational integration determine scalability.**
4. **Automation becomes a productive logistics system only when it is embedded in a robust operating process**



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Thank you for your attention & keep Networking!

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